FCC TEST REPORT

for

Acrox Technologies Co., Ltd.

Nano Receiver

Model Number: MRN/MRT/MRP

FCC ID: PRDRX07

Prepared for	:	Acrox Technologies Co., Ltd.
Address	:	4F., No.89, Minshan St., Neihu Dist.,Taipei City 114, , Taiwan, R.O.C
Prepared by	:	Keyway Testing Technology Co., Ltd.
Address	:	Baishun Industrial Zone, Zhangmutou Town, Dongguan, Guangdong, China
		Tel: 86-769-8718 2258
		Fax: 86-769-8718 1058

Report No.	:	13KWE01433F
Date of Test	:	Jan.17~18, 2013
Date of Report	:	Jan.21,2012

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Keyway Testing Technology Co., Ltd.

Applicant: **Address:**	Acrox Technologies Co., Ltd. 4F., No.89, Minshan St., Neihu Dist.,Taipei City 114, Taiwan, R.O.C
Manufacturer: **Address:**	Acrox Technologies Co., Ltd. 4F., No.89, Minshan St., Neihu Dist.,Taipei City 114, Taiwan, R.O.C
Factor: **Address:**	Acrox Technologies Co., Ltd. Hsinmin Industria,Changan Town,Dongguan City, Guangdong,China
E.U.T:	Nano Receiver
Model Number:	MRN/MRT/MRP
Trade Name:	ACROX/ONN **Serial No.:** ------
Date of Receipt:	Jan.15, 2013 **Date of Test:** Jan.17~18, 2013
Test Specification:	FCC Part 15, Subpart C: Oct. 1, 2010 ANSI C63.4:2009
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied. **Issue Date: Jan.21, 2013**

Tested by:	Reviewed by:	Approved by:
Andy Gao / Engineer	Jade Yang/ Supervisor	Chris Du / Manager

Other Aspects:

None.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

1. GENERAL PRODUCT INFORMATION

1.1. Product Function

Refer to Technical Construction Form and User Manual.

1.2. Description of Device (EUT)

Description	:	Nano Receiver
M/N	:	MRN/MRT/MRP
Power Supply	:	DC 5V from PC input AC 120V/60Hz
Operation Frequency	:	2408~2474MHz
Modulation Technology	:	GFSK
Antenna Type	:	Integrated PCB antenna
Antenna Gain	:	0.5dBi

1.3. Independent Operation Modes

The basic operation modes are:

1.3.1. EUT work continues TX mode and frequency as below:

Channel	:	Frequency
Low	:	2408MHz
Middle	:	2440MHz
High	:	2474MHz

1.4. Difference between Model Numbers

Note: The products are all the same except the model number.

1.5. For test support Unit

Notebook:
Manufacturer: Lenovo
M/N: Lenovo G475
S/N: GB14477457

Adapter:
Manufacturer: Lenovo
M/N: LN-A0403A3C
S/N: 36001672
Input: 100-240V/2.5A,50-60Hz
Output: 20V/2A

2. TEST SITES

2.1. Test Facilities

Lab Qualifications : 944 Shielded Room built by ETS-Lindgren, USA
Date of completion: March 28, 2011

966 Chamber built by ETS-Lindgren, USA
Date of completion: March 28, 2011

Certificated by TUV Rheinland, Germany.
Registration No.: UA 50207153
Date of registration: July 13, 2011

Certificated by UL, USA
Registration No.: 100567-237
Date of registration: September 1, 2011

Certificated by Intertek
Registration No.: 2011-RTL-L1-31
Date of registration: October 11, 2011

Certificated by Industry Canada
Registration No.: 9868A
Date of registration: December 8, 2011

Certificated by FCC, USA
Registration No.: 370994
Date of registration: February 21, 2012

Certificated by CNAS China
Registration No.: CNAS L5783
Date of registration: August 8, 2012

Name of Firm : Keyway Testing Technology Co., Ltd.

Site Location : Baishun Industrial Zone, Zhangmutou Town, Dongguan, Guangdong, China

2.2. List of Test and Measurement Instruments

2.2.1. For Connected emission test (Below 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Jul. 7,12	Jul. 7,13
Artificial Mains Network	Rohde&Schwarz	ENV216	101315	Jul. 2,12	Jul. 2,13
Artificial Mains Network (AUX)	Rohde&Schwarz	ENV216	101314	Jul. 2,12	Jul. 2,13
RF Cable	FUJIKURA	3D-2W	944 Cable	Jul. 2,12	Jul. 2,13

2.2.2. For radiated emission test (Below 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Jul. 7,12	Jul. 7,13
Bilog Antenna	ETS-LINDGREEN	3142D	135452	Jun. 28,12	Jun. 28,13
Spectrum Analyzer	Agilent	E4411B	MY4511304	Jul. 11,12	Jul. 11,13
3m Semi-anechoic Chamber	ETS-LINDGREEN	966	KW01	Aug.29,12	Aug.29,13
Signal Amplifier	SONOMA	310	187016	Jul. 7,12	Jul. 7,13
Signal Amplifier	Agilent	8449B	3008A00251	Jul. 7,12	Jul. 7,13
RF Cable	IMRO	IMRO-400	966 Cable 1#	Jul. 7,12	Jul. 7,13
MULTI-DEVICE Controller	ETS-LINDGREEN	2090	126913	N/A	N/A

2.2.3. For above 1GHz radiated emission, band edge, 20dB bandwidth test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	DAZE	ZN30701	11003	Jul. 11,12	Jul. 11,13
Horn Antenna	SCHWARZBECK	BBHA9170	9170-068	Jul. 11,12	Jul. 11,13
Spectrum Analyzer	Agilent	8593E	3911A04271	Jul. 7,12	Jul. 7,13
3m Semi-anechoic Chamber	ETS-LINDGREN	966	KW01	Jul. 7,12	Jul. 7,13
Signal Amplifier	DAZE	ZN3380C	11001	Jul. 7,12	Jul. 7,13
Signal Amplifier	Agilent	8449B	3008A00251	Jul. 7,12	Jul. 7,13
RF Cable	IMRO	IMRO-400	966 Cable 1#	Jul. 7,12	Jul. 7,13
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A

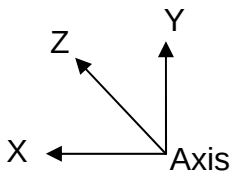
3. TEST SET-UP AND OPERATION MODES

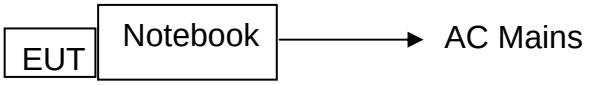
3.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators





(EUT: Nano Receiver)

Note: By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Y axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report. Test data as below.

Frequency (MHz)	Axis	Field Strength (dBuV/m)	Antenna Polarization
2408	X	83.68	Horizontal
2408	Y	84.41	Horizontal
2408	Z	82.19	Horizontal

3.3. Test Operation Mode and Test Software

None.

3.4. Special Accessories and Auxiliary Equipment

None.

3.5. Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

4.1. Conducted Emission at the Mains Terminals Test

4.1.1. Limit 15.209 limits

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

4.1.2. Test setup

The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 0.8 m, the excess was folded back and forth parallel to the cable at the centre so as to form a bundle no longer than 0.4 m.

The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.

The frequency range from 150 kHz to 30 MHz was investigated.

The bandwidth of the test receiver was set at 9 kHz.

The test data of the worst case condition(s) was reported on the following page. All the scanning waveforms were attached within Appendix I.

Test Data

Keyway Testing

Keyway Testing Technology Co.,Ltd.
Baishun Industrial Zone,Zhangmutou
Town,Dongguan,Guangdong,China
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com

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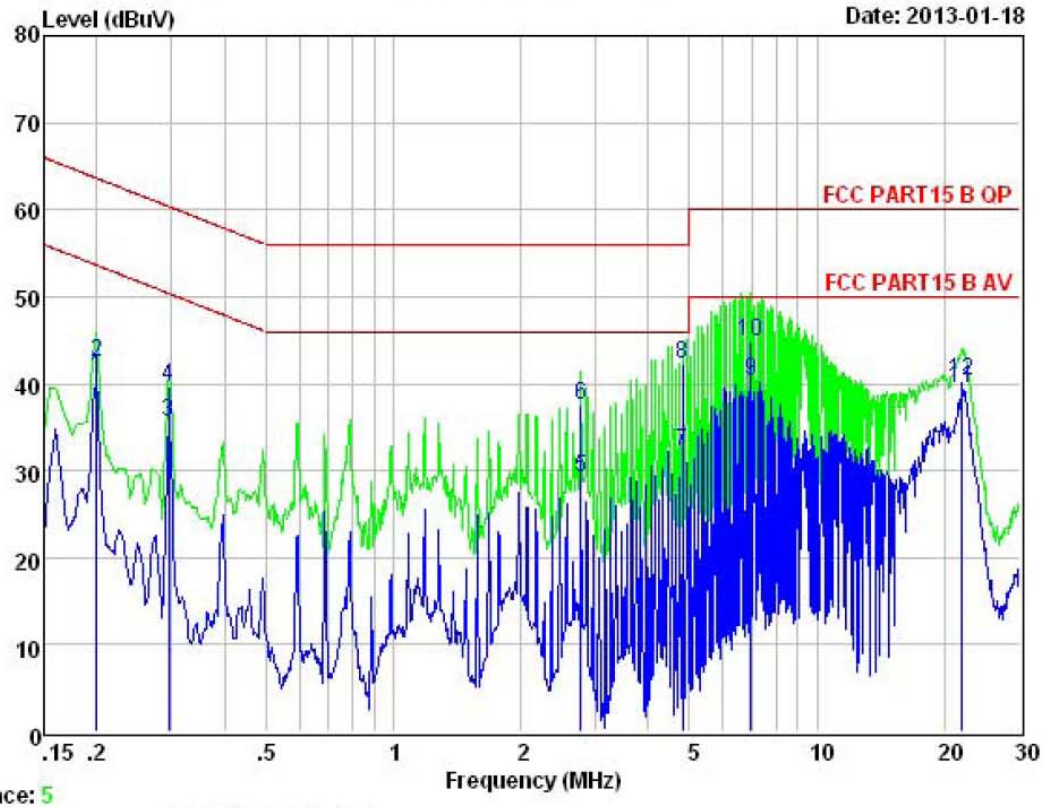

Trace: 5

Site : 944 Shielded Room
Condition : FCC PART15 B QP NEUTRAL
EUT : Nano Receiver
POWER : DC 5V from PC input AC 120V/60Hz
M/N : MRN
Test Engineer: Andy
Comment : Temp:24.7';Humi:56%;Press;101.52kPa
Test Mode : TX Mode

	Freq	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	
1	0.20	40.65	53.62	-12.97	Average
2	0.20	42.57	63.62	-21.05	QP
3	0.30	35.50	50.37	-14.87	Average
4	0.30	39.67	60.37	-20.70	QP
5	2.76	29.19	46.00	-16.81	Average
6	2.76	37.46	56.00	-18.54	QP
7	4.82	32.13	46.00	-13.87	Average
8	4.82	42.18	56.00	-13.82	QP
9	6.99	40.42	50.00	-9.58	Average
10	6.99	44.72	60.00	-15.28	QP
11	21.95	39.42	50.00	-10.58	Average
12	21.95	40.38	60.00	-19.62	QP

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Mail: kwtest@keywaytest.com

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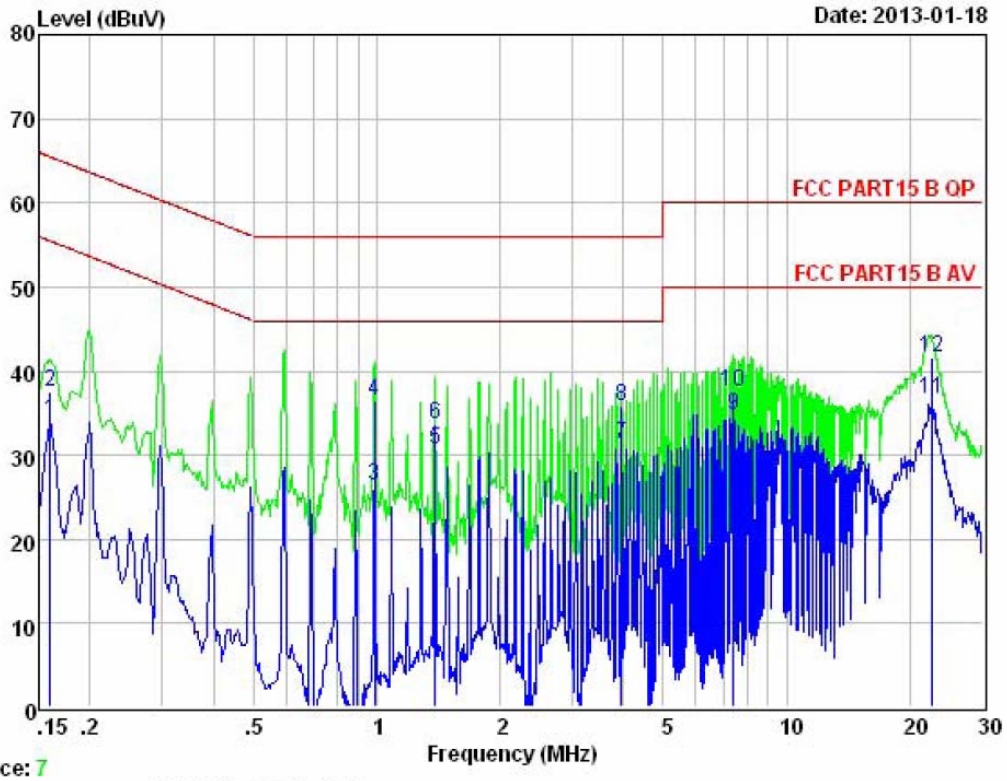


Trace: 7

Site : 944 Shielded Room
Condition : FCC PART15 B QP LINE
EUT : Nano Receiver
POWER : DC 5V from PC input AC 120V/60Hz
M/N : MRN
Test Engineer: Andy
Comment : Temp:24.7';Humi:56%;Press;101.52kPa
Test Mode : TX Mode

	Freq	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	
1	0.16	34.15	55.47	-21.32	Average
2	0.16	37.64	65.47	-27.83	QP
3	0.99	26.39	46.00	-19.61	Average
4	0.99	36.49	56.00	-19.51	QP
5	1.39	30.75	46.00	-15.25	Average
6	1.39	33.67	56.00	-22.33	QP
7	3.94	31.38	46.00	-14.62	Average
8	3.94	35.91	56.00	-20.09	QP
9	7.41	34.78	50.00	-15.22	Average
10	7.41	37.64	60.00	-22.36	QP
11	22.66	36.75	50.00	-13.25	Average
12	22.66	41.67	60.00	-18.33	QP

4.2. Radiated Emission Test

4.2.1. Limit 15.209 limits

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

4.2.2. Fundamental and harmonics emission limits

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902~928 MHz	50	94	500	54
2400~2483.5 MHz	50	94	500	54
5725~5875MHz	50	94	500	54
24.0~24.25GHz	250	108	2500	68

4.2.3. Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

4.2.4. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

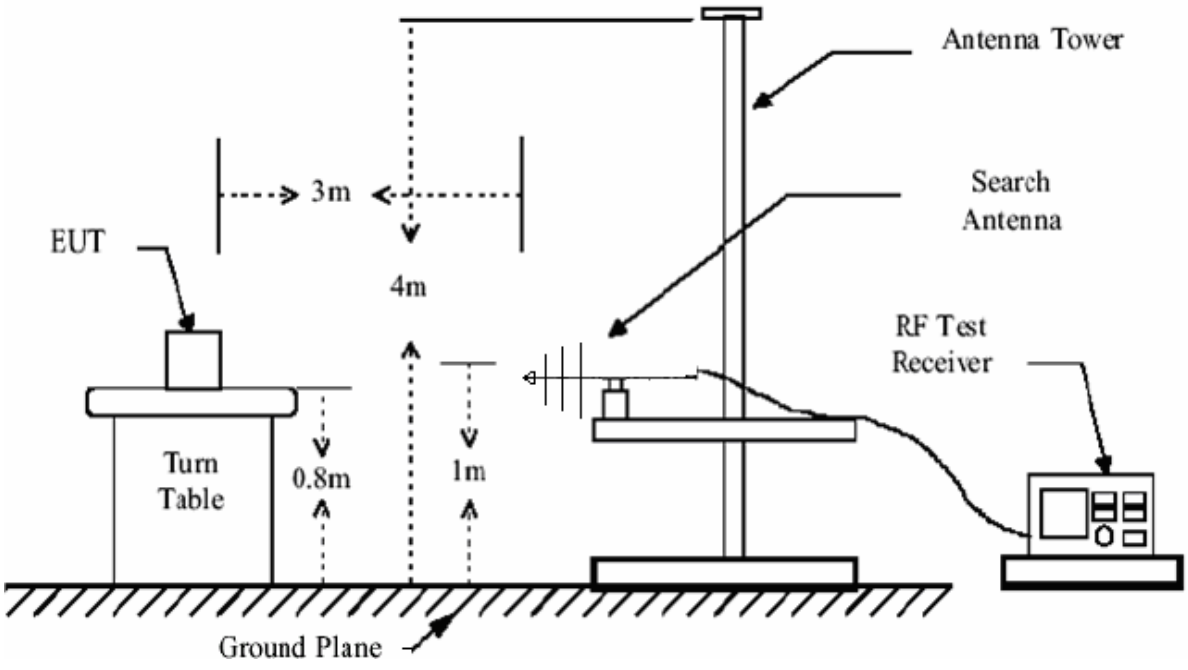
The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz.

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

The test data of the worst case condition(s) was reported on the following pages.



Test Data

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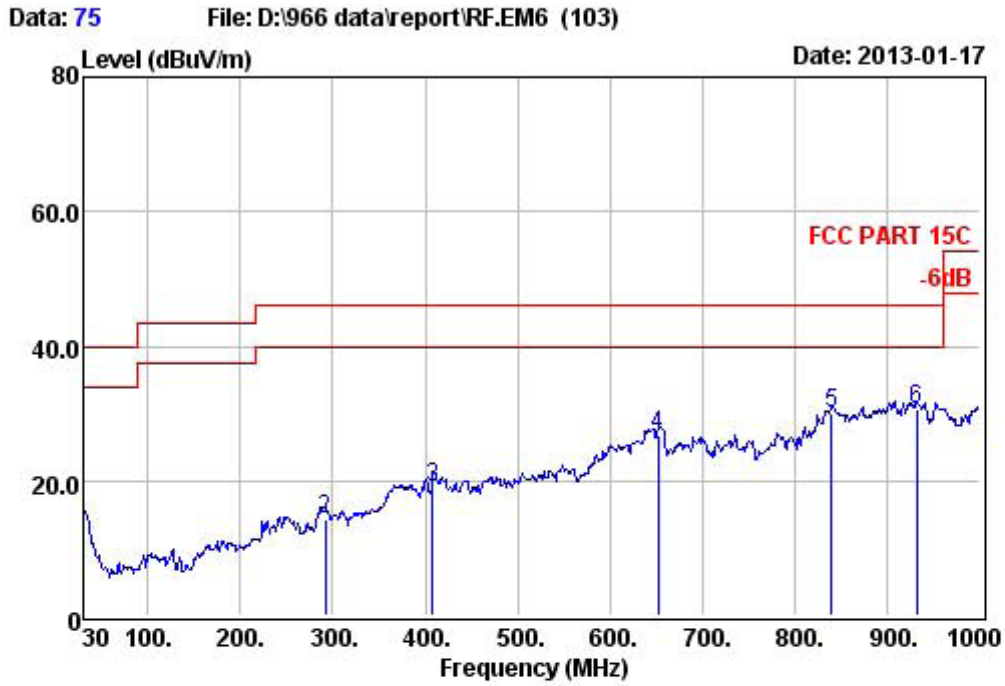

Site : 966 Chamber
Condition: FCC PART 15C 3m 3142D VERTICAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB
1	30.00	31.41	26.31	0.56	18.80	14.26	40.00	-25.74
2	291.90	30.93	29.88	1.87	13.54	14.36	46.00	-31.64
3	408.30	30.63	30.73	2.48	16.57	19.15	46.00	-26.85
4	652.74	30.82	32.61	3.58	21.47	26.84	46.00	-19.16
5	839.95	30.41	32.75	4.59	23.10	30.03	46.00	-15.97
6	932.10	29.78	30.96	4.89	24.67	30.74	46.00	-15.26

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
2. Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.

Keyway Testing

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Baishun Industrial Zone,Zhangmutou
Town,Dongguan,Guangdong,China
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com

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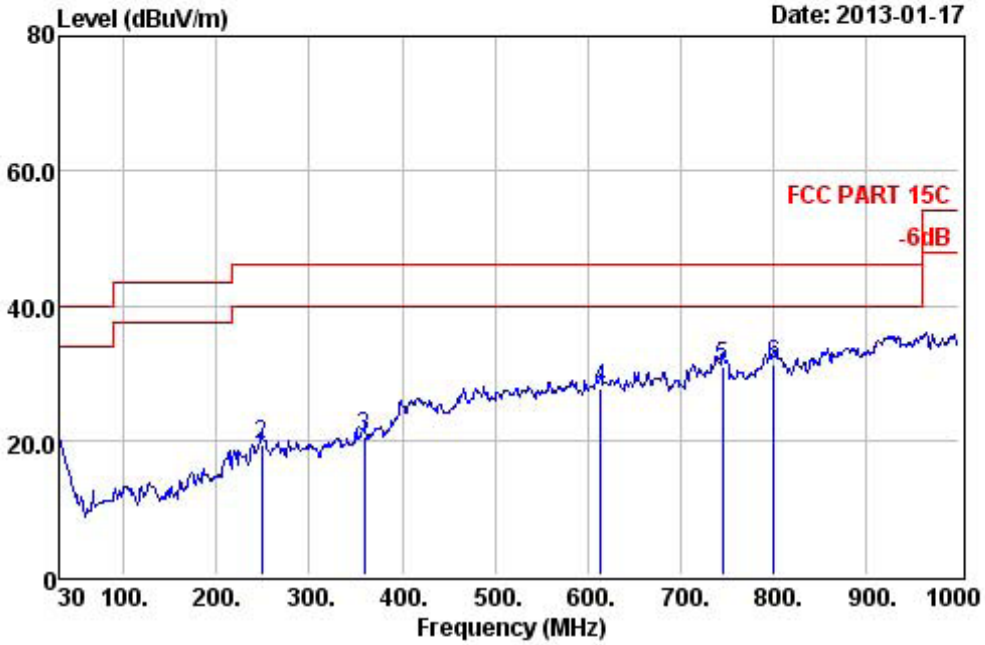

Site : 966 Chamber
Condition: FCC PART 15C 3m 3142D HORIZONTAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB
1	30.00	31.41	32.02	0.56	18.80	19.97	40.00	-20.03
2	248.25	30.96	35.61	1.70	12.85	19.20	46.00	-26.80
3	359.80	30.62	32.95	2.18	16.11	20.62	46.00	-25.38
4	613.94	30.63	33.96	3.38	20.99	27.70	46.00	-18.30
5	745.86	30.67	34.93	4.04	22.77	31.07	46.00	-14.93
6	801.15	30.56	34.49	4.29	23.00	31.22	46.00	-14.78

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
2. Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.

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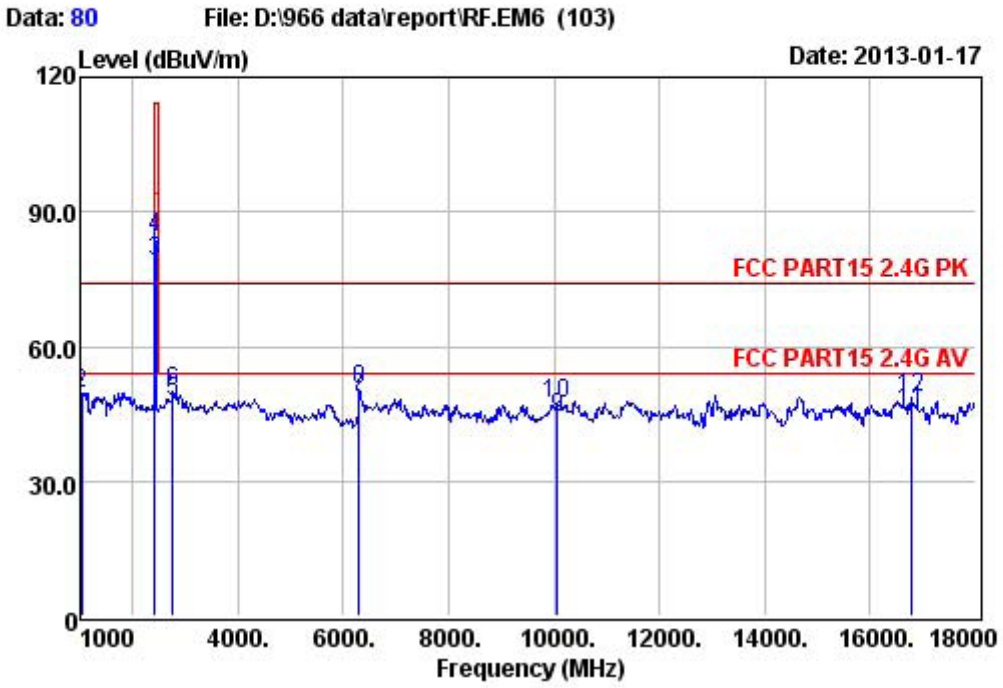

Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2408MHz

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1034.00	26.01	42.16	4.96	24.18	45.29	54.00	-8.71	Average
2	1034.00	26.01	46.49	4.96	24.18	49.62	74.00	-24.38	Peak
3	2408.00	26.32	69.35	7.39	28.73	79.15	94.00	-14.85	Average
4	2408.00	26.32	74.61	7.39	28.73	84.41	114.00	-29.59	Peak
5	2768.00	26.43	35.82	8.84	29.44	47.67	54.00	-6.33	Average
6	2768.00	26.43	37.98	8.84	29.44	49.83	74.00	-24.17	Peak
7	6304.00	27.76	24.21	16.60	35.62	48.67	54.00	-5.33	Average
8	6304.00	27.76	25.91	16.60	35.62	50.37	74.00	-23.63	Peak
9	10061.00	28.81	17.53	16.98	38.51	44.21	54.00	-9.79	Average
10	10061.00	28.81	20.73	16.98	38.51	47.41	74.00	-26.59	Peak
11	16793.00	30.02	10.02	21.18	44.10	45.28	54.00	-8.72	Average
12	16793.00	30.02	13.42	21.18	44.10	48.68	74.00	-25.32	Peak

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
2. Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.

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Baishun Industrial Zone,Zhangmutou
Town,Dongguan,Guangdong,China
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com

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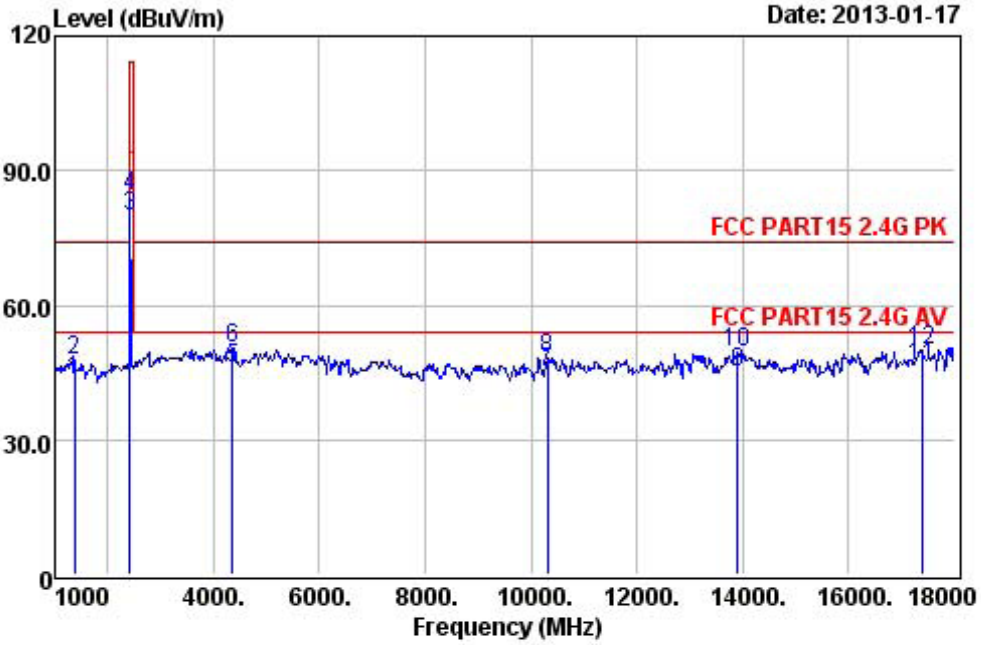


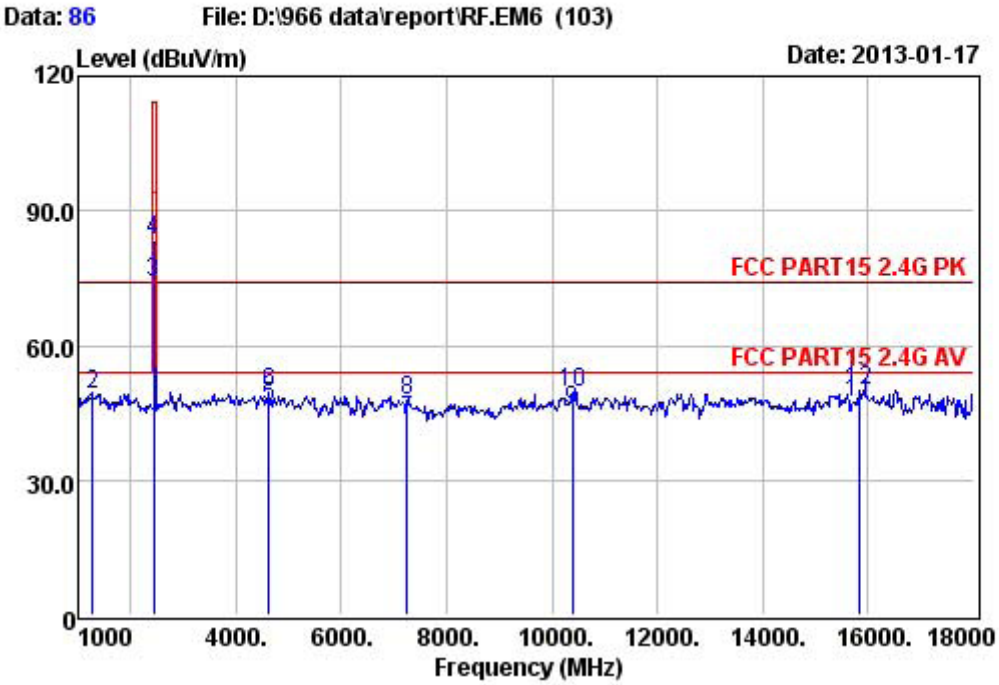
Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2408MHz

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1374.00	26.07	39.02	5.21	25.01	43.17	54.00	-10.83	Average
2	1374.00	26.07	43.53	5.21	25.01	47.68	74.00	-26.32	Peak
3	2408.00	26.32	70.05	7.39	28.73	79.85	94.00	-14.15	Average
4	2408.00	26.32	74.30	7.39	28.73	84.10	114.00	-29.90	Peak
5	4349.00	27.21	30.05	11.03	31.99	45.86	54.00	-8.14	Average
6	4349.00	27.21	34.74	11.03	31.99	50.55	74.00	-23.45	Peak
7	10316.00	28.83	17.99	17.03	38.91	45.10	54.00	-8.90	Average
8	10316.00	28.83	20.91	17.03	38.91	48.02	74.00	-25.98	Peak
9	13903.00	29.38	12.00	19.24	43.40	45.26	54.00	-8.74	Average
10	13903.00	29.38	16.06	19.24	43.40	49.32	74.00	-24.68	Peak
11	17388.00	30.26	9.65	21.69	45.21	46.29	54.00	-7.71	Average
12	17388.00	30.26	13.50	21.69	45.21	50.14	74.00	-23.86	Peak

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
2. Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.

Keyway Testing

Keyway Testing Technology Co.,Ltd.
Baishun Industrial Zone,Zhangmutou
Town,Dongguan,Guangdong,China
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com



Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2440MHz

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1272.00	26.05	40.46	5.14	24.76	44.31	54.00	-9.69	Average
2	1272.00	26.05	45.13	5.14	24.76	48.98	74.00	-25.02	Peak
3	2440.00	26.33	64.14	7.48	28.76	74.05	94.00	-19.95	Average
4	2440.00	26.33	73.63	7.48	28.76	83.54	114.00	-30.46	Peak
5	4621.00	27.38	29.67	11.56	32.49	46.34	54.00	-7.66	Average
6	4621.00	27.38	32.92	11.56	32.49	49.59	74.00	-24.41	Peak
7	7256.00	27.95	17.40	16.61	37.30	43.36	54.00	-10.64	Average
8	7256.00	27.95	21.74	16.61	37.30	47.70	74.00	-26.30	Peak
9	10384.00	28.84	18.08	17.04	39.01	45.29	54.00	-8.71	Average
10	10384.00	28.84	22.46	17.04	39.01	49.67	74.00	-24.33	Peak
11	15824.00	29.67	16.62	20.52	39.64	47.11	54.00	-6.89	Average
12	15824.00	29.67	19.51	20.52	39.64	50.00	74.00	-24.00	Peak

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
2. Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.

Keyway Testing

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Baishun Industrial Zone,Zhangmutou
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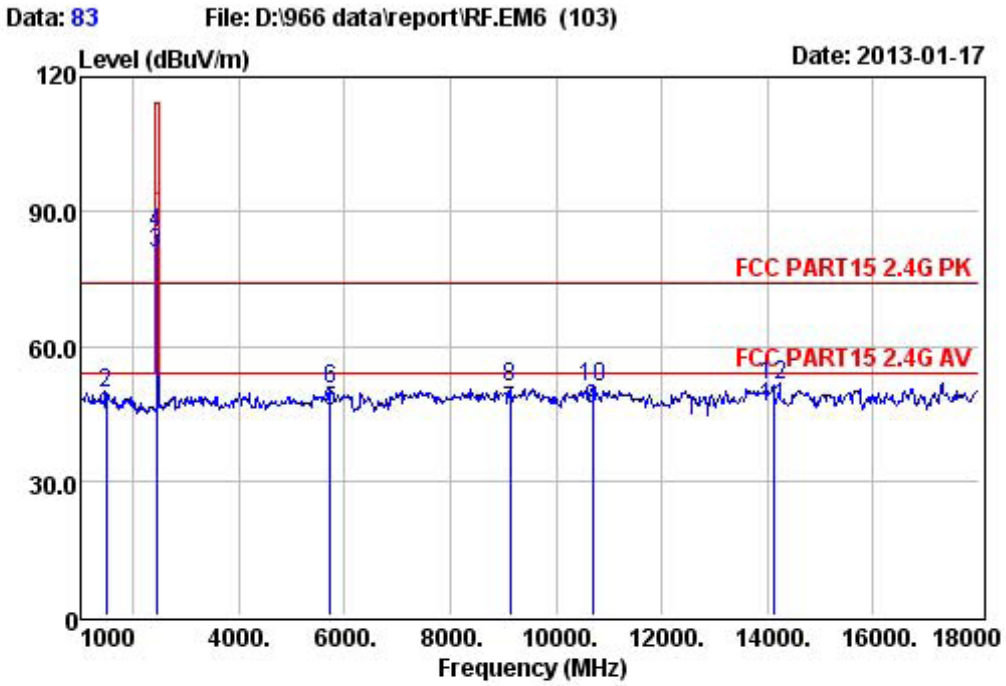
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com



Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2440MHz

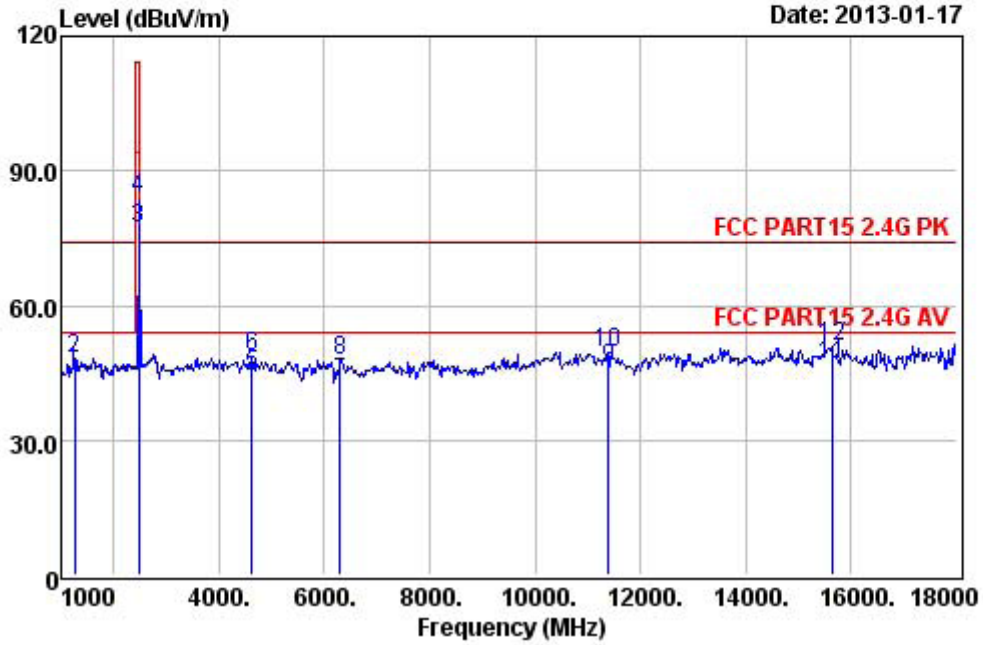
	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1476.00	26.09	40.21	5.33	25.26	44.71	54.00	-9.29	Average
2	1476.00	26.09	45.11	5.33	25.26	49.61	74.00	-24.39	Peak
3	2440.00	26.33	70.63	7.48	28.76	80.54	94.00	-13.46	Average
4	2440.00	26.33	75.51	7.48	28.76	85.42	114.00	-28.58	Peak
5	5726.00	27.67	23.36	15.05	34.59	45.33	54.00	-8.67	Average
6	5726.00	27.67	28.65	15.05	34.59	50.62	74.00	-23.38	Peak
7	9126.00	28.45	19.39	16.89	37.54	45.37	54.00	-8.63	Average
8	9126.00	28.45	24.94	16.89	37.54	50.92	74.00	-23.08	Peak
9	10690.00	28.87	18.58	17.10	39.31	46.12	54.00	-7.88	Average
10	10690.00	28.87	23.19	17.10	39.31	50.73	74.00	-23.27	Peak
11	14107.00	29.42	13.47	19.43	42.90	46.38	54.00	-7.62	Average
12	14107.00	29.42	18.31	19.43	42.90	51.22	74.00	-22.78	Peak

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
2. Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.

Keyway Testing

Keyway Testing Technology Co.,Ltd.
Baishun Industrial Zone,Zhangmutou
Town,Dongguan,Guangdong,China
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com

Data: 87 File: D:\966 data\report\RF.EM6 (103)



Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2474MHz

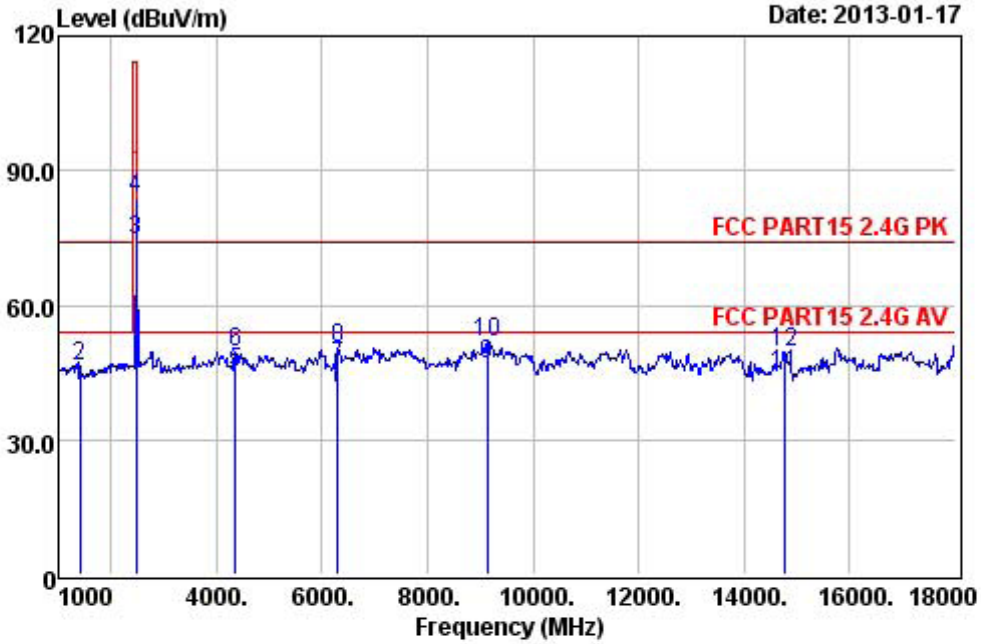
	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1255.00	26.05	41.57	5.13	24.72	45.37	54.00	-8.63	Average
2	1255.00	26.05	44.47	5.13	24.72	48.27	74.00	-25.73	Peak
3	2474.00	26.34	67.11	7.52	28.79	77.08	94.00	-16.92	Average
4	2474.00	26.34	73.70	7.52	28.79	83.67	114.00	-30.33	Peak
5	4621.00	27.38	27.97	11.56	32.49	44.64	54.00	-9.36	Average
6	4621.00	27.38	31.92	11.56	32.49	48.59	74.00	-25.41	Peak
7	6304.00	27.76	18.35	16.60	35.62	42.81	54.00	-11.19	Average
8	6304.00	27.76	23.35	16.60	35.62	47.81	74.00	-26.19	Peak
9	11387.00	28.94	17.70	17.24	39.81	45.81	54.00	-8.19	Average
10	11387.00	28.94	21.44	17.24	39.81	49.55	74.00	-24.45	Peak
11	15637.00	29.65	17.05	20.41	38.92	46.73	54.00	-7.27	Average
12	15637.00	29.65	21.03	20.41	38.92	50.71	74.00	-23.29	Peak

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
2. Measurement Uncertainty: ±3.2dB at a level of confidence of 95%.

Keyway Testing

Keyway Testing Technology Co.,Ltd.
Baishun Industrial Zone,Zhangmutou
Town,Dongguan,Guangdong,China
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com

Data: 88 File: D:\966 data\report\RF.EM6 (103)



Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2474MHz

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1408.00	26.08	37.61	5.25	25.09	41.87	54.00	-12.13	Average
2	1408.00	26.08	42.33	5.25	25.09	46.59	74.00	-27.41	Peak
3	2474.00	26.34	64.52	7.52	28.79	74.49	94.00	-19.51	Average
4	2474.00	26.34	73.70	7.52	28.79	83.67	114.00	-30.33	Peak
5	4349.00	27.21	29.37	11.03	31.99	45.18	54.00	-8.82	Average
6	4349.00	27.21	33.58	11.03	31.99	49.39	74.00	-24.61	Peak
7	6304.00	27.76	21.81	16.60	35.62	46.27	54.00	-7.73	Average
8	6304.00	27.76	26.07	16.60	35.62	50.53	74.00	-23.47	Peak
9	9126.00	28.45	20.83	16.89	37.54	46.81	54.00	-7.19	Average
10	9126.00	28.45	25.94	16.89	37.54	51.92	74.00	-22.08	Peak
11	14753.00	29.51	14.95	19.84	39.55	44.83	54.00	-9.17	Average
12	14753.00	29.51	19.75	19.84	39.55	49.63	74.00	-24.37	Peak

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
2. Measurement Uncertainty: ±3.24 dB at a level of confidence of 95%.

5. 20DB OCCUPY BANDWIDTH

5.1. Limits

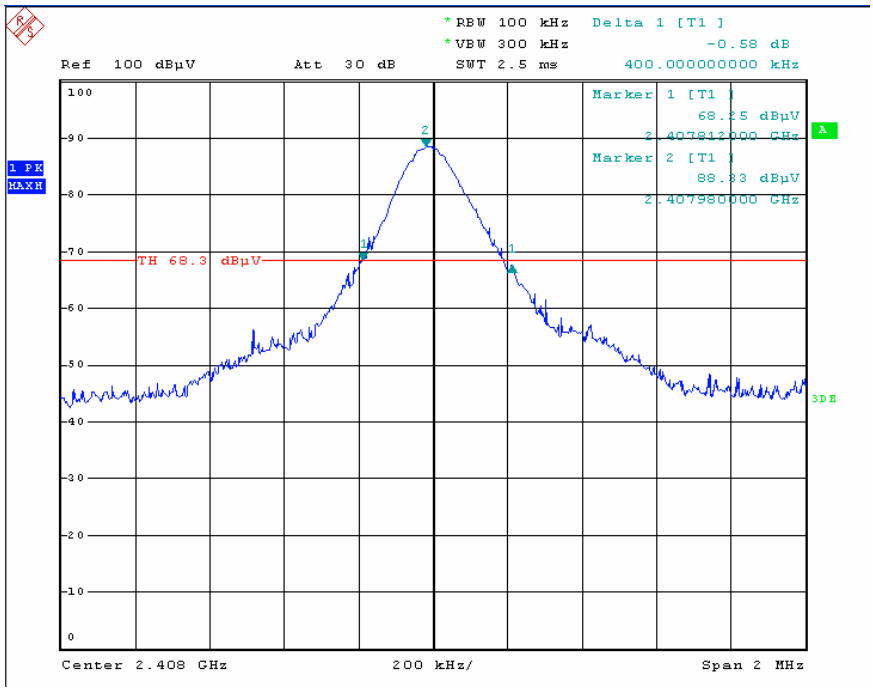
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test data:

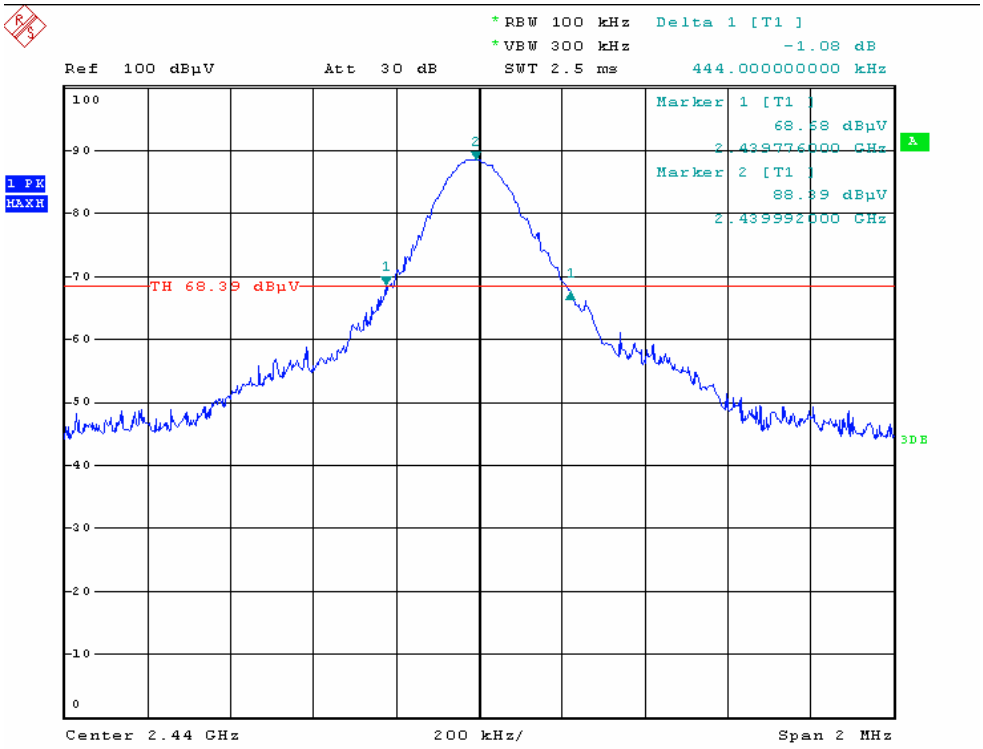
Channel Frequency (MHz)	20dB Bandwidth (MHz)	Limit (kHz)
2408	0.400	N/A
2440	0.444	N/A
2474	0.432	N/A

Test plot as follows:

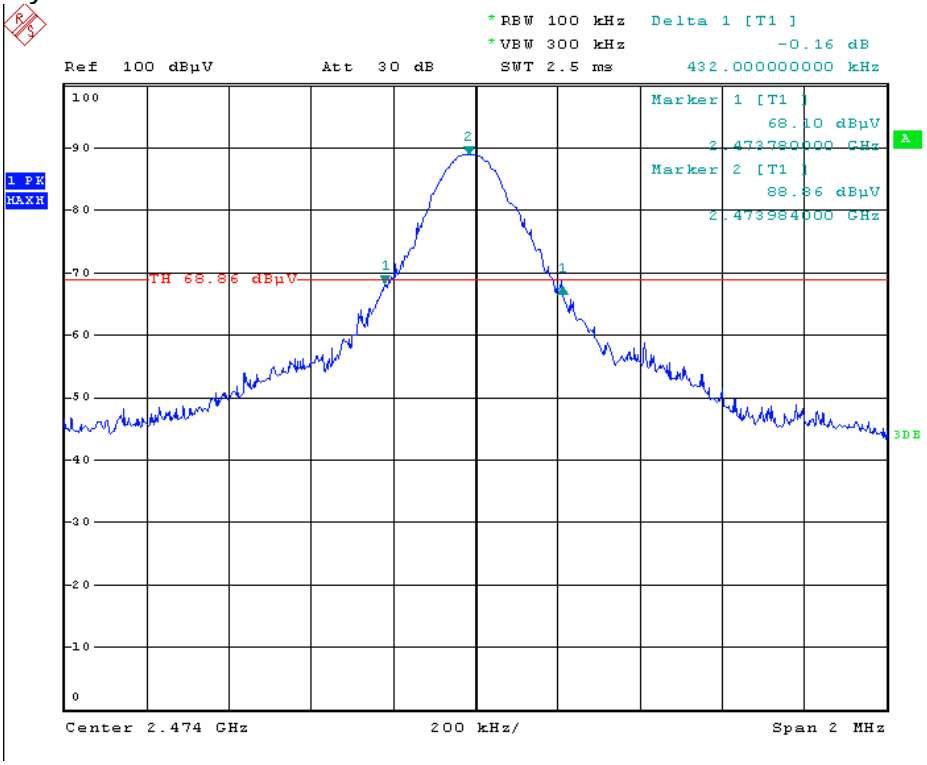
Test Frequency: 2408MHz



Test Frequency: 2440MHz



Test Frequency: 2474MHz



6. BAND EDGE COMPLIANCE TEST

6.1. Limits

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

6.2. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure.

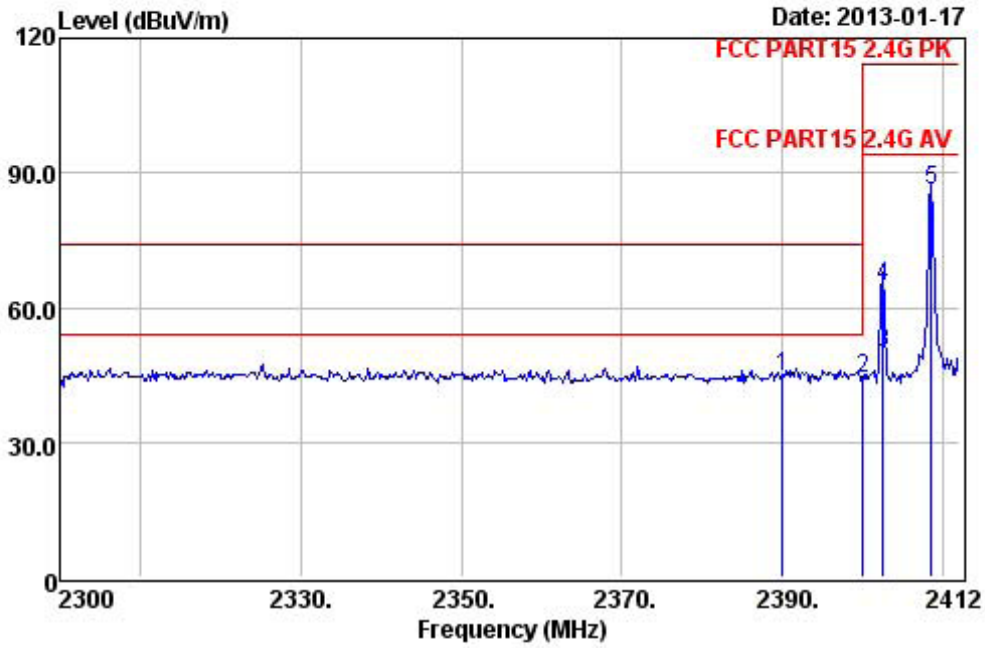
Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

Test plot as follows:

Keyway Testing

Keyway Testing Technology Co.,Ltd.
Baishun Industrial Zone,Zhangmutou
Town,Dongguan,Guangdong,China
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com

Data: 93 File: D:\966 data\report\RF.EM6 (103)



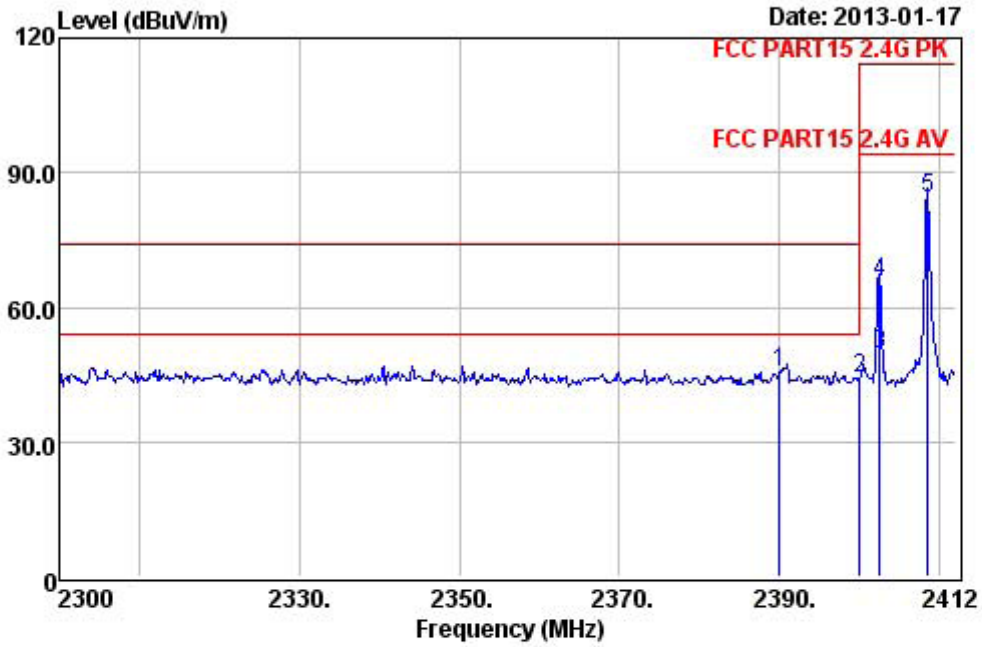
Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2408MHz

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2390.00	26.32	34.90	7.34	28.72	44.64	74.00	-29.36	Peak
2	2400.00	26.32	34.62	7.34	28.72	44.36	74.00	-29.64	Peak
3	2402.60	26.32	40.05	7.39	28.73	49.85	54.00	-4.15	Average
4	2402.60	26.32	54.92	7.39	28.73	64.72	74.00	-9.28	Peak
5	2408.60	26.32	76.11	7.39	28.73	85.91	114.00	-28.09	Peak

Keyway Testing

Keyway Testing Technology Co.,Ltd.
Baishun Industrial Zone,Zhangmutou
Town,Dongguan,Guangdong,China
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com

Data: 92 File: D:\966 data\report\RF.EM6 (103)



Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2408MHz

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2390.00	26.32	35.68	7.34	28.72	45.42	74.00	-28.58	Peak
2	2400.00	26.32	34.24	7.34	28.72	43.98	74.00	-30.02	Peak
3	2402.60	26.32	39.57	7.39	28.73	49.37	54.00	-4.63	Average
4	2402.60	26.32	55.98	7.39	28.73	65.78	74.00	-8.22	Peak
5	2408.60	26.32	74.69	7.39	28.73	84.49	114.00	-29.51	Peak

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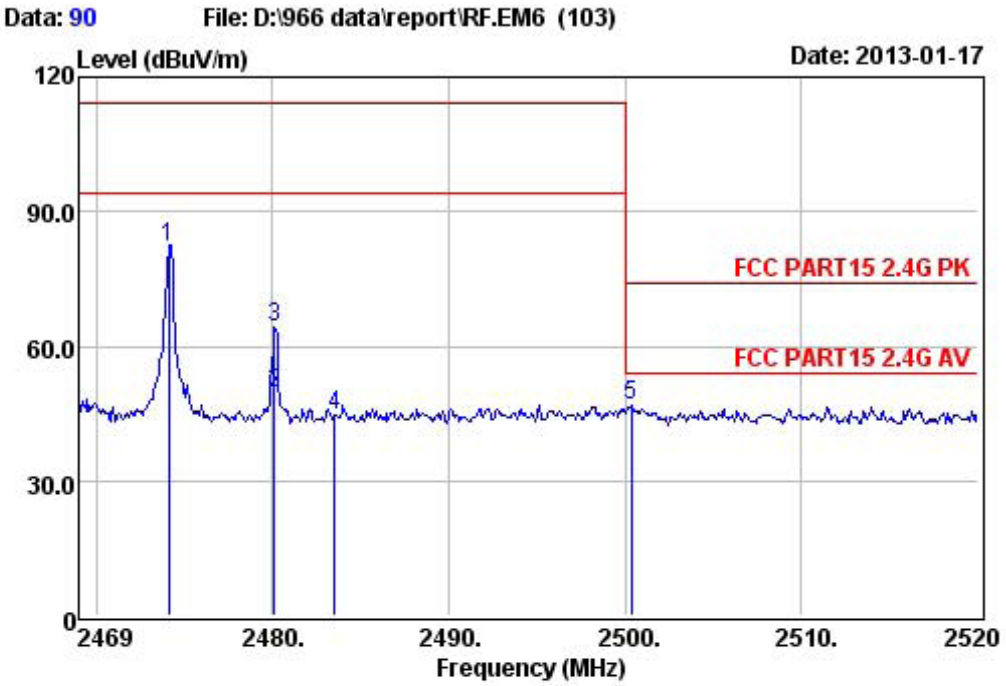

Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2474MHz

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2474.10	26.34	72.01	7.52	28.79	81.98	114.00	-32.02	Peak
2	2480.10	26.34	39.44	7.57	28.79	49.46	54.00	-4.54	Average
3	2480.10	26.34	54.28	7.57	28.79	64.30	74.00	-9.70	Peak
4	2483.50	26.34	34.68	7.57	28.79	44.70	74.00	-29.30	Peak
5	2500.32	26.35	36.70	7.61	28.80	46.76	74.00	-27.24	Peak

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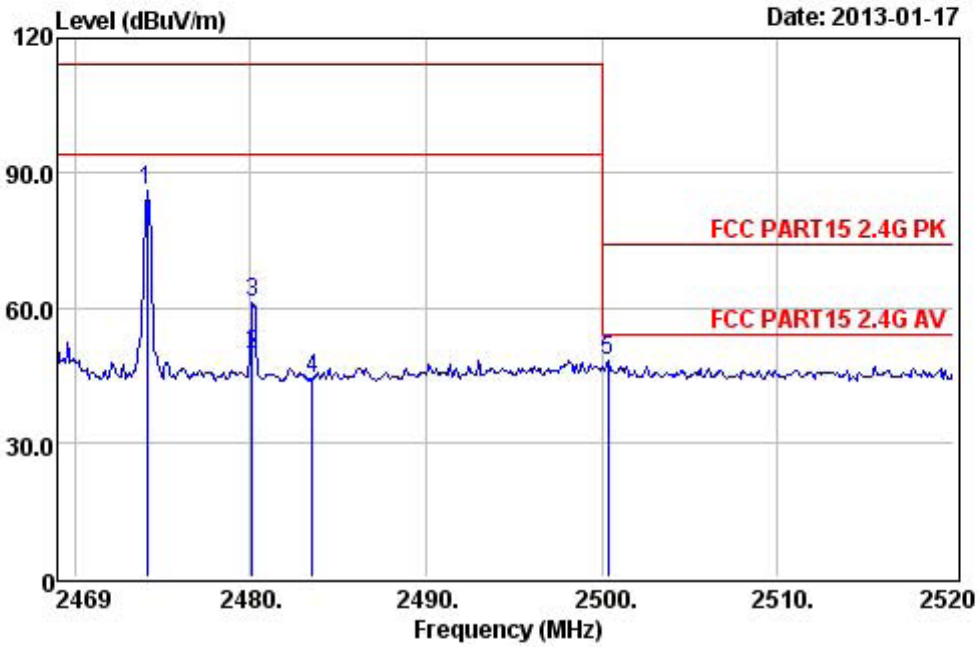
Baishun Industrial Zone,Zhangmutou
Town,Dongguan,Guangdong,China
Tel: 0769-87182258
Fax: 0769-87181058
Mail: kwtest@keywaytest.com

Data: 89 File: D:\966 data\report\RF.EM6 (103)



Site : 966 Chamber
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL
EUT : Nano Receiver
M/N : MRN
Power : DC 5V from PC input AC 120V/60Hz
Test By : Andy
Comment : Temp:24.8'C Humi:56% Press:101.52kPa
Test Mode: TX Mode 2474MHz

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2474.10	26.34	75.92	7.52	28.79	85.89	114.00	-28.11	Peak
2	2480.10	26.34	39.35	7.57	28.79	49.37	54.00	-4.63	Average
3	2480.10	26.34	51.13	7.57	28.79	61.15	74.00	-12.85	Peak
4	2483.50	26.34	34.16	7.57	28.79	44.18	74.00	-29.82	Peak
5	2500.32	26.35	38.21	7.61	28.80	48.27	74.00	-25.73	Peak

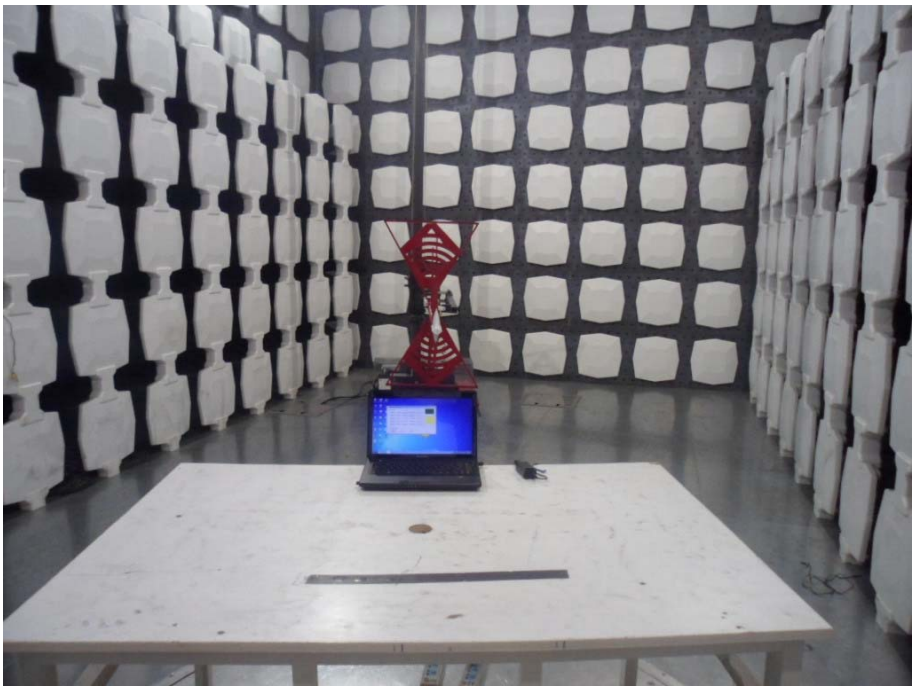
7. ANTENNA REQUIREMENT:

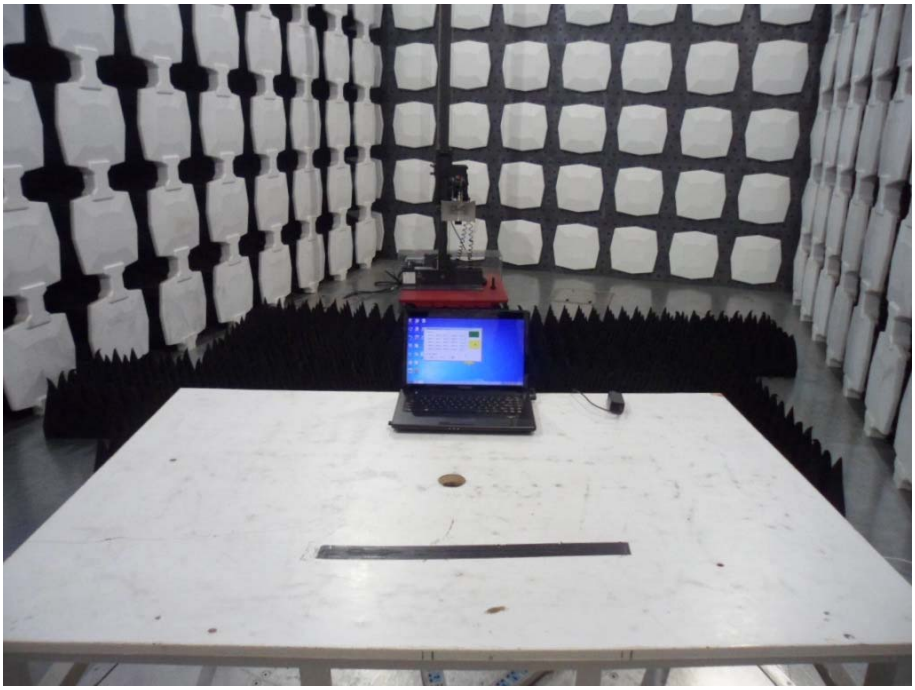
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna:	
The antenna is Integral antenna, the best case gain of the antenna is 0.5dBi	

8. PHOTOGRAPHS OF TEST SET-UP

8.1. Set-up for Conducted Emission Test

8.2. Set-up for Radiated Emission Test





9. PHOTOGRAPHS OF THE EUT

Figure 1
General Appearance of the EUT

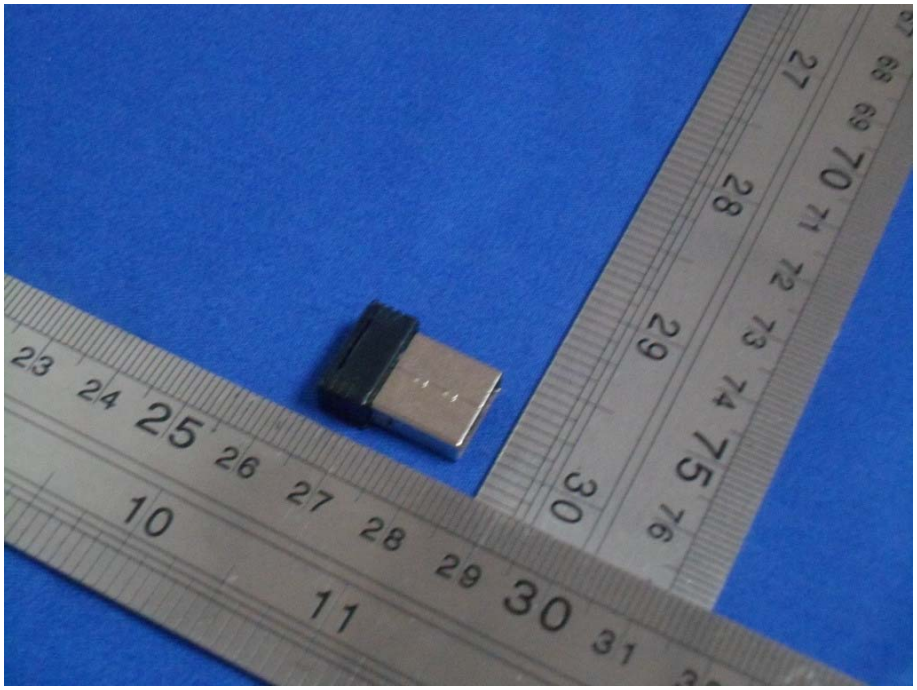


Figure 2
General Appearance of the EUT

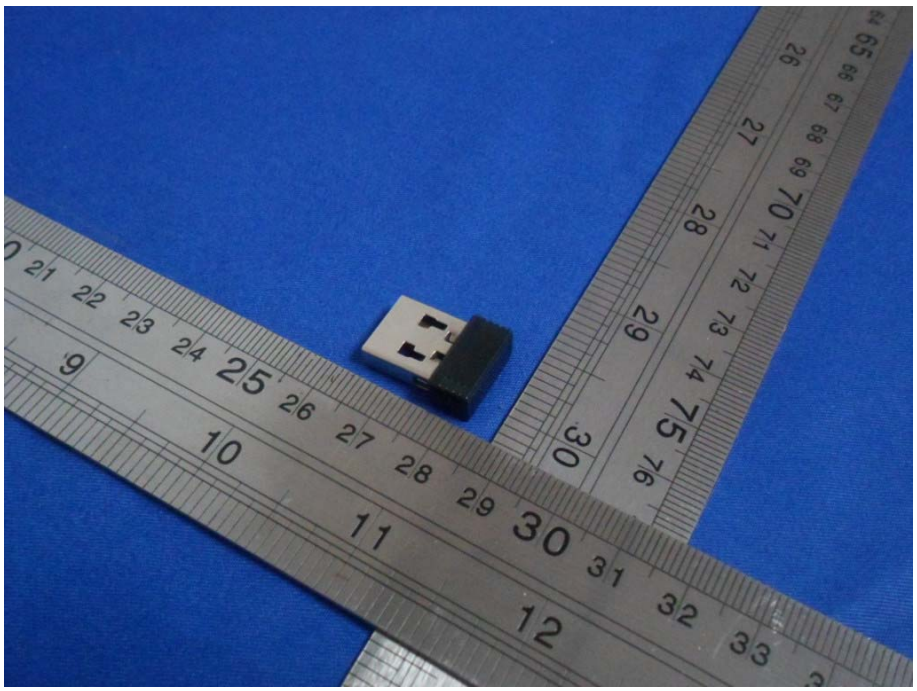


Figure 3
General Appearance of the PCB

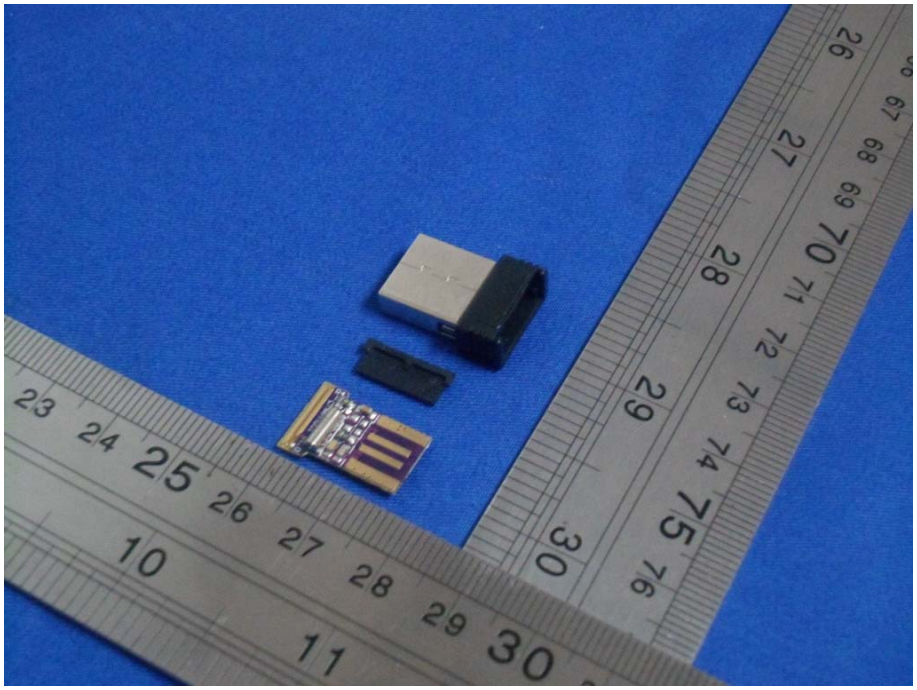


Figure 4
General Appearance of the PCB

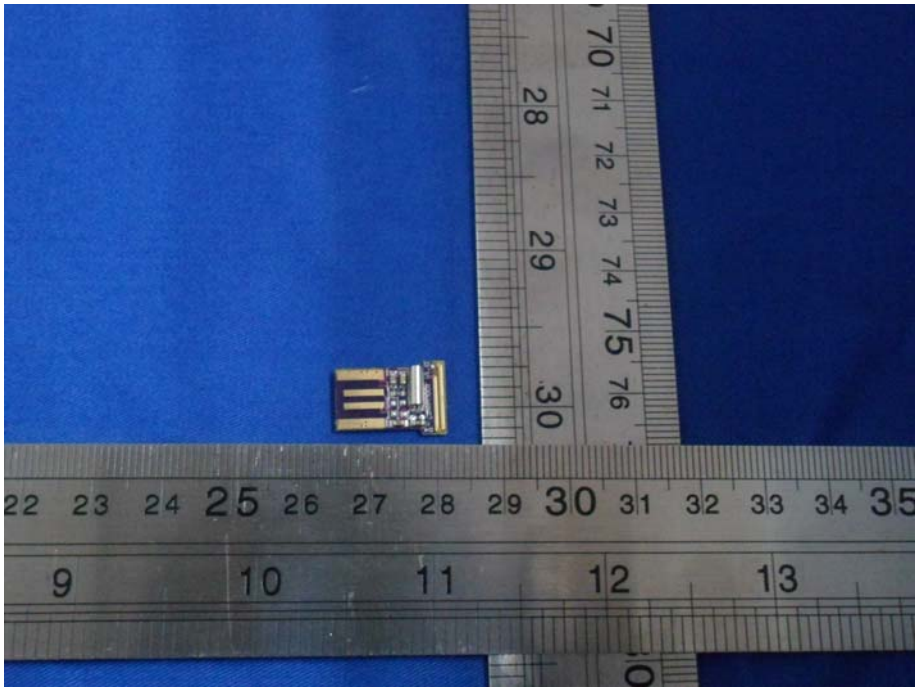
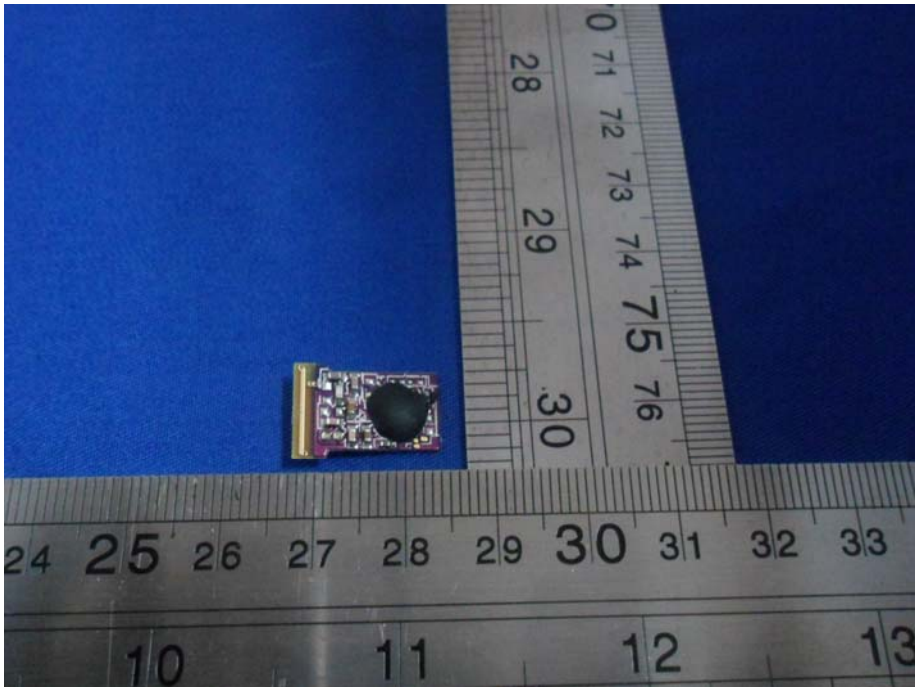


Figure 5
General Appearance of the PCB



END.